LINCOLN
PUBLIC WORKS AND UTILITIES

2017
Annual Drinking Water Quality Report

Why This Report?

The Safe Drinking Water Act requires Lincoln Water System to annually issue a report describing the quality of your drinking water. This report fulfills that obligation and puts important information about the quality of your drinking water into the hands of our valued customers. This report provides an overview of last year's water quality data collected from January 1 through December 31, 2017, including details about the source of your water, what it contains and how it compares to state and federal standards.

Este formulario tiene información muy importante acerca del agua que usted bebe. Consiga que alguien se lo lea en español.

Báo cáo này chứa thông tin quan trọng về nước bạn uống. Tìm một người đọc nó cho bạn bằng tiếng Việt.

This report and other information about water are available on the City's website at water.lincoln.ne.gov.

OPERATING PHILOSOPHY

Lincoln Water System is dedicated to providing quality water and customer service to the community.

This philosophy results in reliable and cost-effective operations, efficient service to customers, and a safe and adequate supply of water.

Lincoln Water System | 2021 N. 27th | Lincoln, NE
Chris Beutler, Mayor | Miki Esposito, Director, Public Works and Utilities

Test Results (2017 data unless otherwise noted)

Regulated Contaminants

Tested and Detected	Units	Regulatory Limit (MCL)	Goal (MCLG)	Ashland Plants	Lincoln *(a)*	Violation Yes/No	Likely Source (in U.S. drinking water systems)
Inorganic Contaminants							
Antimony - Ashland (08/16)	ppb	6	6	ND-0.672			Discharge from petroleum refineries, Fire retardants; ceramics; electronics; solder
Arsenic - Ashland	ppb	10	N/A	5.99-7.09	-	No	Erosion of natural deposits; runoff from orchards; runoff from glass and electronic production
Barium - Ashland (08/16)	ppb	2000	2000	113-154	-	No	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Copper ***(c)*** - Lincoln (06/16) 90th percentile	ppm	1.3*	1.3	N/A	0.008-0.972 0.846	No	Corrosion of household plumbing; erosion of natural deposits; leaching from wood preservatives
Fluoride ***(d)*** (monthly)	ppm	4	4	0.977-0.989	0.84-0.97 ***(b)***	No	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories
Lead ***(c)*** (6/16) - Lincoln 90th percentile	ppb	15*	0	N/A	ND-403 ***(b)*** 4.41	No	Corrosion of household plumbing; erosion of natural deposits
Nickel - Ashland (08/16)	ppb	100	N/A	1.48-2.15	-	No	Erosion of natural deposits; leaching
Nitrate+Nitrite - Ashland	ppm	10	10	0.85-1.27	-	No	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Selenium	ppb	50	50	ND-6.61		No	Erosion of natural deposits
Synthetic Organic Contaminants (Pesticides and Herbicides)							
Atrazine - Ashland	ppb	3	3	ND-0.091	-	No	Runoff from atrazine used on row crops
Radioactive Contaminants							
Combined Radium 226 and 228 (11/15) combined	pCi/L	5	0	0.62-1.04	-	No	Erosion of natural deposits
Radium - 228 (11/15) Ashland	ug/L	30	0	0.62-1.04	-	No	Erosion of natural deposits
Disinfection - Byproducts							
Trihalomethanes - Lincoln maximum RAA	ppb	80	N/A	26.5	25.8-47.6 32.99	No	Byproduct of drinking water chlorination
Total Haloacetic Acid Lincoln maximum RAA	ppb	60	N/A	N/A	4.11-19.6 11.2	No	Byproduct of drinking water chlorination
Bromate	ppb	10	0	1.2-3.0	N/A	No	Byproduct of drinking water ozonation
Clarity							
Turbidity ***(e)***	NTU	0.3	N/A	0.05-0.23	N/A	No	Soil runoff

Microbiological	Total Coliform Maximum Contaminant Level	Goal (MCLG)	Highest Monthly Positive Coliform Samples	Total Positive E. Coli or Fecal Coliform Samples in 2017	Violation	Fecal Coliform or E. Coli Maximum Contaminant Level	Likely Source of Contamination
Coliform Bacteria	5% of monthly samples are positive	0	2 (1.75%)	5	No	Fecal Coliform or E. Coli MCL; A routine sample and a repeat sample are total coliform positive, and one is also fecal coliform or E. Coli positive.	Total Coliform bacteria are naturally present in the environment. Fecal coliform and E. Coli are present in human and animal fecal waste.

Repeated Testing

Unregulated Contaminants Tested

Lincoln Water System monitors the following unregulated contaminants:

Tested and Detected	Ashland	Units
Total Organic Carbon	2.9-3.1 *(f)*	ppm
Sulfate	72.6-95.5	ppm

The City of Lincoln is required to test for the following contaminants: Coliform Bacteria, Antimony, Arsenic, Asbestos, Barium, Beryllium, Cadmium, Chromium, Copper, Cyanide, Fluoride, Lead, Mercury, Nickel, Nitrate, Nitrite, Selenium, Sodium, Thallium, Alachlor, Atrazine, Benzo(a)pyrene, Carbofuran, Chlordane, Dalapon, Di(2-ethylhexyl)adipate, Dibromochloropropane, Dinoseb, Di(2-ethylhexyl)- phthalate, Diquat, 2,4-D, Endothall, Endrin, Ethylene dibromide, Glyphosate, Heptachlor, Heptachlor epoxide, Hexachlorobenzene, Hexachlorocyclopentadiene, Lindane, Metolachlor, Methoxychlor, Oxamyl (Vydate), Pentachlorophenol, Picloram, Polychlorinated biphenyls, Simazine, Toxaphene, Dioxin, Silvex, Benzene, Carbon Tetrachloride, o-Dichloro-benzene, Para-Dichlorobenzene, 1,2-Dichlorethane, 1,1-Dichloroethylene, Cis-1,2,-Dichloroethylene, Trans-1,2-Dichloroethylene, Dichloromethane, 1,2-Dichloropropane, Ethylbenzene, Monochlorobenzene, 1,2,4-Trichloro- benzene, 1,1,1-Trichloroethane, 1,1,2-Trichloroethane, Trichloroethylene, Vinyl Chloride, Styrene, Tetrachloroethylene, Toluene, Xylenes (total), Gross Alpha (minus Uranium & Radium 226), Radium 226 plus Radium 228, Sulfate, Chloroform, Bromodichloromethane, Chlorodibromomethane, Bromoform, Chlorobenzene, m-Dichlorobenzene, 1,1-Dichloropropene, 1,1-Dichloroethane, 1,1,2,2-Tetrachlorethane, 1,2-Dichloropropane, Chloromethane, Bromomethane, 1,2,3-Trichloropropane, 1,1,1,2-Tetrachloroethane, Chloroethane, 2,2-Dichloropropane, o-Chlorotoluene, p-Chlorotoluene, Bromobenzene, 1,3-Dichloropropene, Aldrin, Butachlor, Carbaryl, Dicamba, Dieldrin, 3-Hydroxycarbofuran, Methomyl, Metolachlor, Metribuzin, Propachlor.

Lincoln's water is moderately hard.

Alkalinity, pH and hardness are important when considering a water softener.

Key to Test Results

MCL - Maximum Contaminant Level: The highest level of a contaminant allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

MCLG - Maximum Contaminant Level Goal: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

ppm (parts per million) = mg/L (milligrams per liter) - One ppm corresponds to 1 gallon of water in 1 million gallons of water.

ppb (parts per billion) - One ppb corresponds to 1 gallon of water in 1 billion gallons of water.

N/A - Not applicable

ND - Not detected

pCi/L - pico curies per liter (measure of radioactivity)

NTU - Nephelometric Turbidity Unit: A measure of the cloudiness of the water

LRA - Locational Running Average

RAA - Running Annual Average: An ongoing annual average calculation of data from the most recent four quarters.

90th Percentile – Represents the highest value found out of 90 percent of the samples taken in a representative group. If the 90th percentile is greater than the action level, it will trigger a treatment or other requirements that a water system must follow.

(a) No water was pumped from Lincoln peaking wells in 2011-2017.

(b) Samples collected from homes and businesses in the distribution system.

(c) Water from the treatment plant does not contain lead or copper. Tests for lead and copper are collected from the customer's tap to ensure the substances have not been dissolved from the customer's service lines or interior piping system.

(d) Fluoride is added in treatment to bring the natural level of about 0.4 ppm to the optimum of 0.8 ppm.

(e) TT - Treatment Technique

(f) Samples collected quarterly from 10/1/2016 - 10/31/2017

* Action Level is the concentration of a contaminant which triggers treatment or another requirement which a water system must follow.

Water Quality Parameters 2017

(Average of 12 monthly water quality analyses)

pH (in pH units)	7.63
Total Alkalinity (CaCO3)	196 ppm
Total Hardness (CaCO3) (13 grains per gallon)	236 ppm
Total Dissolved Solids	406 ppm
Calcium	64 ppm
Chloride	23 ppm
Iron	<0.05 ppm
Manganese	2.6 ppb
Sodium	34.4 ppm
Sulfate	95.5 ppm

Conservation Tips

- Check household faucets for leaks. A faucet with even a slow drip takes 10 to 25 gallons of water per month. Just think, 15 drips per minute add up to almost 3 gallons of water wasted per day, 65 gallons wasted per month and 788 gallons wasted per year!
- Keep showers to five minutes or less in length. A five-minute shower takes 10 to 25 gallons of water.
- Keep a pitcher of water in the refrigerator. Then you won't have to run tap water to cool it.
- Use a broom to sweep your driveway, garage or sidewalk instead of using water.
- Use a bucket of water to wash your bike or the family car, and rinse quickly with a hose.
- Water your lawn in the evening or in the early morning to avoid evaporation. Be careful to water only the lawn and not the sidewalk or street.
- Use water only when you need it. Don't leave water running, and be sure to turn it off when you are finished.

Water Conservation Poster Contest

Lincoln fifth-graders participate annually in a water conservation poster contest sponsored by the Mayor's Environmental Task Force. The top entry received in 2017 was submitted by Harper Schupbach of Pyrtle Elementary, and her artwork was displayed on a StarTran bus board.

Conserve . . . Reduce Outdoor Water Use

The last time Lincoln had mandatory water restrictions was during the drought of 2012. Since that time, the City has revised its Water Management Plan to simplify watering restrictions. One important change was placing all multi-family, commercial, industrial and governmental properties, street medians and single-family properties with a common irrigation system on a set schedule regardless of address. Designated watering days for these properties are on Sundays, Tuesdays and Fridays. Single-family properties and duplexes will be on the designated day schedule shown below based on even/odd numbered addresses.

Designated Day Outdoor Watering Schedule

Property Type	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Multi-family, commercial, industrial, governmental, institutional properties, street medians and single family properties (townhome developments) with a common irrigation system. **All addresses.**	☑		☑			☑	
Single-family properties and duplexes with even-numbered addresses (ending in 0,2,4,6 or 8)	☑			☑		☑	
Single-family properties and duplexes with odd-numbered addresses (ending in 1,3,5,7 or 9)			☑		☑		☑

On warm summer days, several million gallons of treated drinking water are used to irrigate lawns in Lincoln. Customers are reminded that the designated three-day watering schedule is available to provide flexibility when watering. The schedule is not meant to suggest that lawns be watered all three days. Rather, property owners should consider using only minimal amounts of water to maintain landscapes, and restrict weekly watering to one or two days, if possible.

The Water Management Plan allows occasional outdoor watering at any time using an attended, handheld hose. This provides for watering of landscape materials, container plantings and bird baths without risk of ticketing during mandatory restrictions.

For additional information regarding the Water Management Plan and other helpful tips on water conservation, please visit water.lincoln.ne.gov, or contact the Water Management Hotline at 402-441-1212.

What is the source of our water?

In the United States, drinking water sources include rivers, lakes, streams, ponds, reservoirs, springs and groundwater. Lincoln's water source is groundwater that is naturally high in quality. It comes from wells under the Platte River near Ashland where the ground water is under the direct influence of surface water. In 2017, more than 12.3 billion gallons of water was pumped from these wells to serve the 280,369 people who use an average of about 33.8 million gallons of water each day.

A source water assessment of our water supply has been completed by the Nebraska Department of Environmental Quality (NDEQ). The assessment includes maps, an inventory of potential contaminant sources and a determination of the vulnerability of the system to contamination. If you have any questions or would like to view the source water assessment, call John Keith, 402-441-1622, to schedule an appointment.

How pure is our drinking water?

As water travels over the surface of the land or through the ground, naturally occurring minerals dissolve, and the water can pick up substances resulting from the presence of animal or human activities. Factors that can impact the purity of our water include microbial contaminants, organic or inorganic contaminants, and even pesticides, herbicides and radioactive contaminants. To ensure that tap water is safe, U.S. Environmental Protection Agency (USEPA) Safe Drinking Water standards limit the amount of contaminants in the water supplied to customers. Lincoln's drinking water continues to meet all of these standards. Lincoln's water does contain small amounts of atrazine, trihalomethanes and arsenic but these levels remain well below USEPA Safe Drinking Water standards.

Atrazine is a herbicide used by farmers to kill weeds in corn and grain sorghum. Atrazine is applied to the fields at planting time. When it rains, atrazine is washed from fields and enters streams and rivers.

Trihalomethanes include four chemicals formed when chlorine, which is added to the water to prevent bacteria, reacts with naturally occurring organic matter in the water. The maximum level allowed is 80 parts per billion, and Lincoln's water has always been below this level. It should be noted that any harmful health effects caused by disinfection byproducts are small compared with the health risks associated with inadequate disinfection.

Arsenic, a naturally occurring element associated with soil and rock, is also detected in Lincoln's drinking water and remains below USEPA limits. The Safe Drinking Water standard (MCL) for arsenic is 10 ppb. While Lincoln's drinking water meets USEPA's standard, it does contain between 6.0 ppb and 7.1 ppb arsenic based on testing performed in 2017. USEPA's standard balances arsenic's possible health effects against the cost of removing it from drinking water. USEPA continues to research the health effects. At concentrations much higher than regulatory levels, arsenic is known to cause some types of cancer and other health problems. Lincoln Water System continues to evaluate options for future treatment and removal of arsenic as regulations require.

How is our water purified?

Thanks to the natural filtration of groundwater, nature has already done much of the work in enhancing the quality of Lincoln's water. Lincoln's source water still contains iron and manganese, which pose no health concern but can stain clothing and plumbing fixtures if left untreated. To remove these unwanted elements, water is pumped to the water treatment plants. The water flows through one of two processes before it is distributed to your home or business.

- The oldest process, highly effective since the 1930s, uses aeration, chlorination, detention and filtration. An exact amount of chlorine is added to the water in a large underground reservoir. The water is held in the reservoir for up to two hours. The iron and manganese form particles which are then trapped in the sand and gravel filters. The filters are cleaned every 120 hours using a process called backwashing.
- The second process uses ozone technology. Ozone, an extremely strong oxidizer and disinfectant, reacts quickly with iron and manganese to form particles which are then removed in the filtration process.

The next step is vital to protecting the health of our community. Once the water passes through the filters, small but exact amounts of chlorine and ammonia are added. These chemicals combine to form a disinfectant called "chloramine," which prevents the growth of bacteria in the City's water distribution pipes. Finally, fluoride is added to help prevent tooth decay.

Lead And Copper

Lincoln's drinking water does not contain detectable levels of lead and copper in its source water or after treatment. However, the presence of lead and copper used in plumbing systems can introduce detectable levels of these contaminants into the drinking water at individual homes or businesses. Water testing conducted by Lincoln Water System has found detectable levels of lead and copper in homes built before 1988. These homes are more likely to have pipes, fixtures and solder that contain lead, although the levels remain below USEPA action levels. In Nebraska, plumbing materials containing high concentrations of lead were banned in 1987. Homes built before 1950 may have a portion of the water service actually constructed using lead pipes, and these homes may have higher levels of lead in their drinking water. To learn more about the materials that may be present in your home's water service, contact the Lincoln Water System at 402-441-7571.

Safe drinking water properties vary across the country depending on the water source. Lincoln's drinking water is non-corrosive and does not cause large amounts of lead and copper from home and business plumbing systems to be dissolved into the water. As a result, Lincoln Water System remains in compliance with USEPA requirements for lead and copper.

Lead and copper sampling is performed by Lincoln Water System every three years as required by the USEPA Lead and Copper Rule (LCR). The collective test results for the 57 samples collected in 2016 were below the USEPA action level of 15 parts per billion lead and 1,300 parts per billion copper. The statistical analysis of the test results continues to show Lincoln's drinking water remains in compliance with USEPA requirements for lead and copper. In 2016, only one sample collected from a private water service containing lead pipes tested above the action level for lead, which shows that lead containing plumping materials can increase exposure to lead from drinking water inside individual homes.

If present, elevated levels of lead and copper can cause serious health problems, especially for infants, young children and pregnant women. Lead and copper in drinking water comes primarily from materials and components associated with service lines and home plumbing. Other sources of lead exposure can be lead-based paint and lead-contaminated dust, as reported by the U.S. Centers for Disease Control and Prevention (CDC).

Lincoln Water System is responsible for providing high quality drinking water, but cannot control the variety of materials used in household and business plumbing components. When the water in your pipes has been sitting for several hours, USEPA recommends minimizing the potential for lead exposure by flushing your cold water tap for 30 seconds to two minutes before using the cold water for drinking or cooking. Because private plumbing system construction varies, Lincoln Water System recommends flushing for at least five minutes in homes constructed prior to 1950. Consider filling a water pitcher for drinking water to avoid repeated flushing.

If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from these sources:

- USEPA Safe Drinking Water Hotline at 800-426-4791.
- USEPA website at epa.gov/safewater/lead.
- Department of Health and Human Services / Division of Public Health / Office of Drinking Water at 402-471-2541.
- The Lincoln-Lancaster County Health Department at 402-441-8000.

How can residents help protect our water?

You, our customers, also play an important role in protecting Lincoln's drinking water. One way to help is by preventing "cross connections", any connection between the drinking water supply and a source of possible contamination or pollution. Cross connections are controlled either by eliminating them or installing approved backflow prevention devices that stop contaminates from flowing back into the drinking water supply.

Contaminants and pollutants can enter the drinking water supply when there is a sudden loss of pressure from heavy usage or a fire in the area of a broken water main. When that happens, contaminated water could be siphoned through the plumbing system into the public water mains. These pressure drops occur somewhere in the City almost every day. Backflow prevention devices are important in preventing contaminants from entering the water supply in these situations.

Every five years, property owners and tenants are required by Nebraska Department of Health and Human Services regulations to inspect their plumbing systems and report any suspected or potential cross connections to Lincoln Water System. Residential and commercial customers are notified when a "premise survey" is required. These surveys must be completed and sent back to Lincoln Water System. All cross connections to the public water supply must be protected with a suitable backflow prevention device.

Property owners and tenants have the responsibility to identify if any cross connections exist on their property and to ensure they are properly protected with an approved backflow prevention device. Property owners and tenants must have these devices tested annually to ensure proper, continuous operation. A list of registered testers can be obtained from Lincoln Water System by calling 402-441-5912. The cost of the test is the responsibility of the owner. For more information on the cross connection program, visit the City's website at water.lincoln.ne.gov.

Lawn Irrigation Systems

The Lincoln Plumbing Code requires a backflow device on lawn irrigation systems. Backflow devices on lawn irrigation systems are exempt from annual testing. However, to ensure proper operation and to protect against contamination of the interior plumbing system, it is recommended these devices are also inspected and tested at regular intervals. Contact your local irrigation system contractor or plumbing contractor for additional information.

Special Health Requirements

While the presence of chloramines in our water is not a cause for concern among the general public, home dialysis patients, immuno-compromised individuals and aquarium owners must take special precautions before the water can be used.

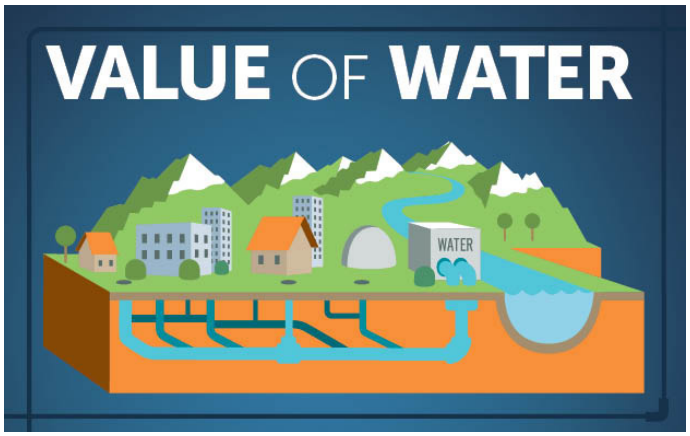
Water used for kidney dialysis equipment may require further treatment. Please contact your doctor or dialysis technician to ensure that your home equipment is adequate and proper tests are being made every time it is used.

Some people may be more vulnerable to contaminants in drinking water than the general population. This includes immuno-compromised persons, such as those with cancer who are undergoing chemotherapy, those who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly people and infants. These customers and caregivers should seek advice about drinking water from their health care providers. USEPA/CDC guidelines on how to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available by calling the Safe Drinking Water Hotline at 800-426-4791.

What does this information mean?

The USEPA and Nebraska Drinking Water Program establish the safe drinking water regulations that limit the amount of contaminants allowed in drinking water. As the regulations require, Lincoln Water System routinely tests your water for numerous contaminants. The test results in this report show the concentrations of detected substances in comparison to the regulatory limits. The State requires monitoring of certain contaminants less than once per year because the concentrations of these contaminants do not change frequently. Therefore, some of this data may be older than one year.

The presence of contaminants does not necessarily indicate a health risk. More information about contaminants and potential health effects can be obtained by visiting the USEPA's website at epa.gov, calling the USEPA hotline at 800-426-4791 or calling the Lincoln-Lancaster County Health Department at 402-441-8000.



The Value of Water

Ongoing access to clean, safe water is critical to our economy, health and way of life. Our community depends on this valuable resource and the infrastructure that connects, protects and supports it.

Home Water Treatment Devices

LWS meets all state and federal water quality standards. Use of a supplemental filter or home water treatment device is a personal preference, however, if not properly maintained, it could cause water quality problems. In selecting a filter or home water treatment device, determine what substance you want to remove and look for a filter that has a National Sanitation Foundation / Underwriter's Laboratories (NSF/UL) certification to remove those specific substances. Information on plumbing fixtures and in-home filters is available by calling 1.800.NSF.MARK or visiting nsf.org.

American Water Works Association
Nebraska Section

Lincoln Water System is a proud member of AWWA.

Lincoln Water System Facts

- Lincoln Water System spends $1.37 million for electricity and diesel fuel to pump water to Lincoln and another $1.46 million for electricity to distribute water to all parts of the City.
- Each person in Lincoln used an average of 121 gallons of water every day in 2017.
- The City of Lincoln covers an area of more than 95 square miles.
- Lincoln Water System maintains 1,230 miles of water mains, 11,850 fire hydrants and 27,750 valves.
- 101 broken mains were repaired in 2017.
- Water service lines between the main and private property are owned and maintained by the property owner.
- Water delivered to your home or business can vary in temperature from 49°F to 76°F.

FUN FACTS

- Without water, the earth would look like the moon.
- All living things need water to live. People can live several weeks without food, but only a few days without water. We should drink six to eight glasses of water each day!
- Water makes up 83 percent of our blood, 70 percent of our brain and 90 percent of our lungs. Overall, our bodies are 70 percent water.
- A tomato is about 95 percent water. An apple, a pineapple, and an ear of corn are each 80 percent water.

To Learn More

For answers to questions you may have or to learn more about the water you drink, call John Keith, Manager of Laboratory Services, Lincoln Water System, at 402-441-1622. This report and other information about water are available on the City's website at water.lincoln.ne.gov.

Drinking water quality and the infrastructure required to deliver water to homes and businesses in Lincoln are essential to the community. The Lincoln Water System Facilities Master Plan, available at lincoln.ne.gov (keyword: water master plan) is a great way to learn more about Lincoln's water system and its future plans for providing the community an adequate supply of high-quality drinking water. The Mayor and City Council make decisions regarding Lincoln Water System. To participate or provide input, contact your City Council representative. A list is available at council.lincoln.ne.gov.